HYSTAT

Design, Manufacturing,
Repair & Maintenance of:

HYDRAULIC CYLINDERS
ACCUMULATORS
ROTARY ACTUATORS
ROTARY DISTRIBUTORS

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HYSTAT

OPERATING & MAINTENANCE INSTRUCTIONS

Piston Accumulators

(Including Gas Bottles and associated units)

HYSTAT

CONTENTS

Issued in accordance with the Pressure Equipment Directive 2014/68/EU Annex I Essential Safety Requirements Section 3.4.
Also the UK Pressure Equipment Safety Regulations PE(S)R 2016 Sch 2 Pt3 (30).

⚠ CAUTION

Before stripping or testing any vessel, ensure all testing equipment has been inspected so that it is safe to use. Failure to do so can cause catastrophic damage to yourself or others around you. These instructions should only be undertaken by competent and trained personnel.

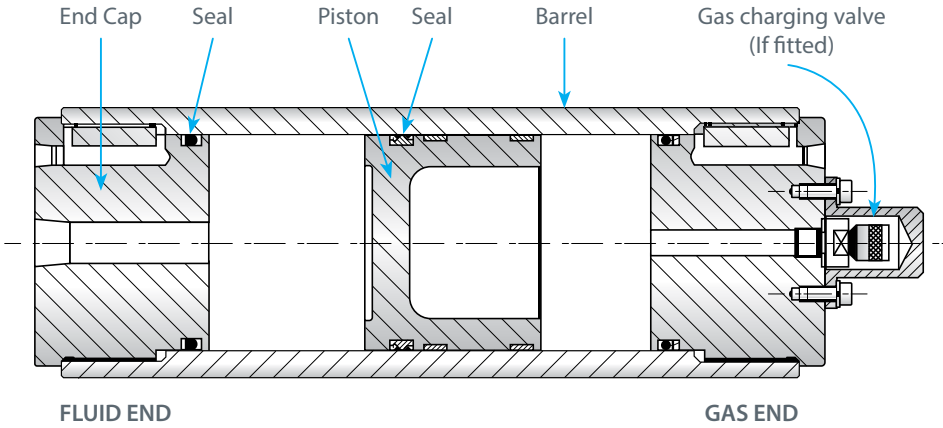
If in doubt please seek advice.

1/ DESCRIPTION

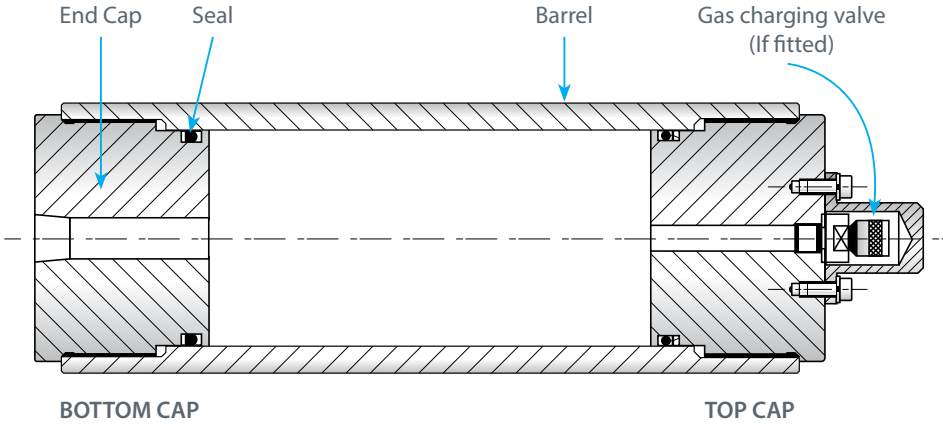
Piston Accumulators consist of a barrel, two end caps and a piston. Gas Bottles consist of a barrel and two end caps. They are essentially the same design but where Accumulators have a piston to separate the Fluid and Gas mediums the Gas Bottles do not have a piston fitted.

For the purpose of this manual we will refer to Accumulators in the text.

PISTON ACCUMULATOR



GAS BOTTLE



2/ TRANSPORTATION AND HANDLING

The Accumulators will normally be shipped either on pallets or in wooden packing crates for road going and/or overseas transportation. Weights should be noted on the delivery documentation accompanying the goods.

Special care needs to be taken not to damage the gas valve or any other attachments as unexpected release of gas may occur.

Accumulators are not normally shipped with a gas pre-charge but in some cases this may be done and extra warnings will be applied to make the user aware that the unit is fully pressurized.

Plugs in ports should not be removed until the unit is about to be connected to the oil and gas supply. If open ports are seen during transportation and handling this must be reported to Hystat immediately to avoid possible contamination.

3/ STORAGE

If the accumulator is to be stored prior to installation, it is recommended that the following points are followed:-

A) Accumulators should be stored inside, preferably in heated and ventilated premises.

B) We recommend that the unit is stored vertically if possible to avoid settling of moisture in the bore.

C) The accumulator internals should be protected by being either :-

1 – Left full of hydraulic fluid (piston at gas end).
2 – Internally treated with compatible and approved inhibitor (piston at gas end).

D) All unpainted external parts should be protected with a corrosion inhibitive material.

4/ INSTALLATION

Hystat inspect and pack the Accumulators at our factory to ensure the units are ready for installation. Please check the goods received do not show signs of damage caused during transit. If any damage is apparent then advise Hystat for the relevant instructions on how to proceed.

Tapped holes are provided at each end of the unit and can be used for lifting the unit into position. We recommend the use of multi-direction lifting eyes such as the 'RUD' lift type. Accumulators must be secured so they cannot fall over. We recommend the use of metal straps or 'U' bolts to firmly clamp the Accumulators to a secure fabrication.

Ports are fitted with either plastic or metal plugs depending on the port configuration. These plugs should only be removed immediately before connecting to the system to limit contamination of the unit. Be aware that there may be a residual pressure build up due to temperature changes and that plugs must be removed with caution.

Check that the unit is being connected to the system it is designed for. With multiple unit deliveries there may be vessels supplied that look very similar but are rated differently.

5/ OPERATION

Accumulators should only be operated at the specified pressure and temperatures shown on the label and on the arrangement drawing.

OPERATING OUTSIDE THE VALUES SPECIFIED FOR THE UNIT COULD HAVE SEVERE CONSEQUENCES.

Fluids used should be clean to SAE AS4059 Class 6B-F, NAS 1638 Class 6 or better. Failure to maintain a clean system will result in a reduced life of the vessel. Use only the fluid type shown on the drawing. If other fluids are to be used please contact Hystat to confirm suitability.

All fittings and piping attached to the unit must be cleaned to the correct cleanliness level.

6/ WARNINGS

Pistin accumulators operate at high pressures. Care and caution should always be taken by personnel working in these areas. Failures are possible, it is therefore important that all fittings/pipes and hoses incorporate an adequate pressure safety margin.

Hydraulic fluids and gases can be hazardous, especially when under pressure. Always wear correct safety clothing, in particular gloves, goggles and a safety helmet.

In the event of fluids contacting the skin, always wash immediately and consult in the safety/cleaning procedure offered by the manufacturer. Continual skin exposure can lead to skin disorders. Always handle with care, store containers safely and ensure the label of its contents is clearly displayed.

Before attempting any maintenance both fluid and gas pressure must be completely released. Fluid pressure should be vented to tank. Gas pressure should be vented to atmosphere (see note below on venting). If a gas charging valve is fitted, then an appropriate charging / discharging set must be used.

Note: If burst discs (rupture type) are fitted and over pressurisation occurs they will vent to atmosphere. Please ensure that the risks associated with exhausting gas are made aware to operators of the equipment and in the event of burst disc rupture every precaution is taken to stop potential injury to personnel.

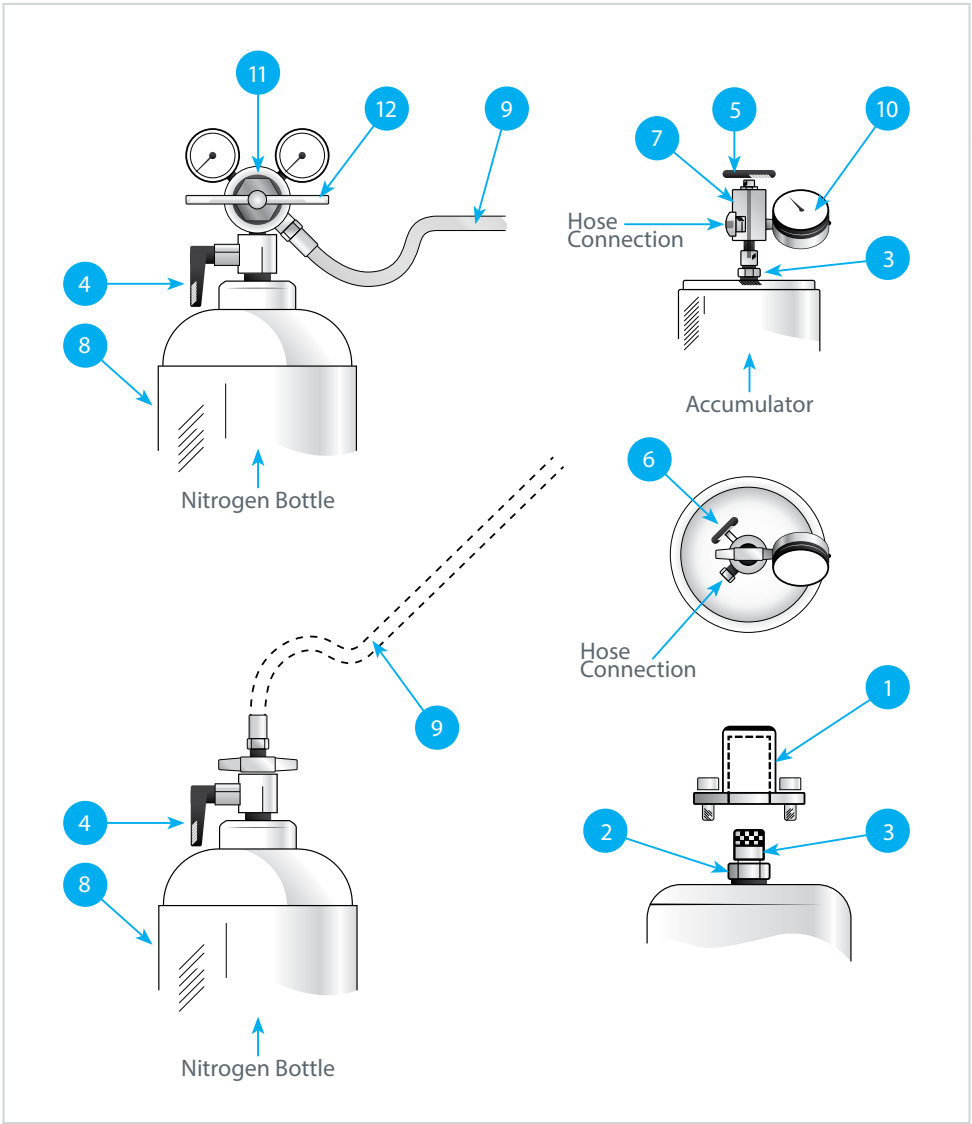
Burst discs have an exhaust tapping so that if required they can be piped away.

If unsure please contact Hystat for more information.

Venting Nitrogen into a confined space is very dangerous due to the asphyxiating nature of the gas and can lead to breathing difficulties.

7/ PRE-CHARGING AND DIS-CHARGING PROCEDURE FOR ACCUMULATORS AND SIMILAR EQUIPMENT UP TO 760 BARG

IMPORTANT NOTE: ONLY USE OXYGEN FREE DRY NITROGEN (99.995%)



CHARGING PROCEDURE

- Remove the protective cap (1) by unscrewing the two M6 screws using a 5mm Allen key.
- Remove the Gas Valve Cap (3) from Gas Charging valve (2).
- The use of a regulator (11) attached to the Nitrogen bottle (8) is advised. The pressure can be set to the correct pressure before gas is applied to the unit using adjustment handle (12).
- **If a regulator is not used and gas bottle is connected directly to charging set caution should be taken to ensure the gas is controlled by slowly turning the key (4).**
- Ensure centre 'T' bar (5) is fully unwound and bleed valve (6) is fully closed. Attach charging set (7) to cylinder gas valve.
- Connect charging hose (9) to nitrogen cylinder (8) using the appropriate adaptor and attach the free end to the charging set.
- Turn 'T' bar (5) clockwise to open gas valve. Do not screw down tight.
- Allow pressure on gauge (10) to read slightly in excess of required pressure and then close nitrogen cylinder valve (4). This will allow for any settling of gas pressure.
- Turn 'T' bar (5) anti-clockwise to seal gas valve.
- Crack bleed (6) to exhaust gas from charging hose then remove hose and replace sealing cap if available.

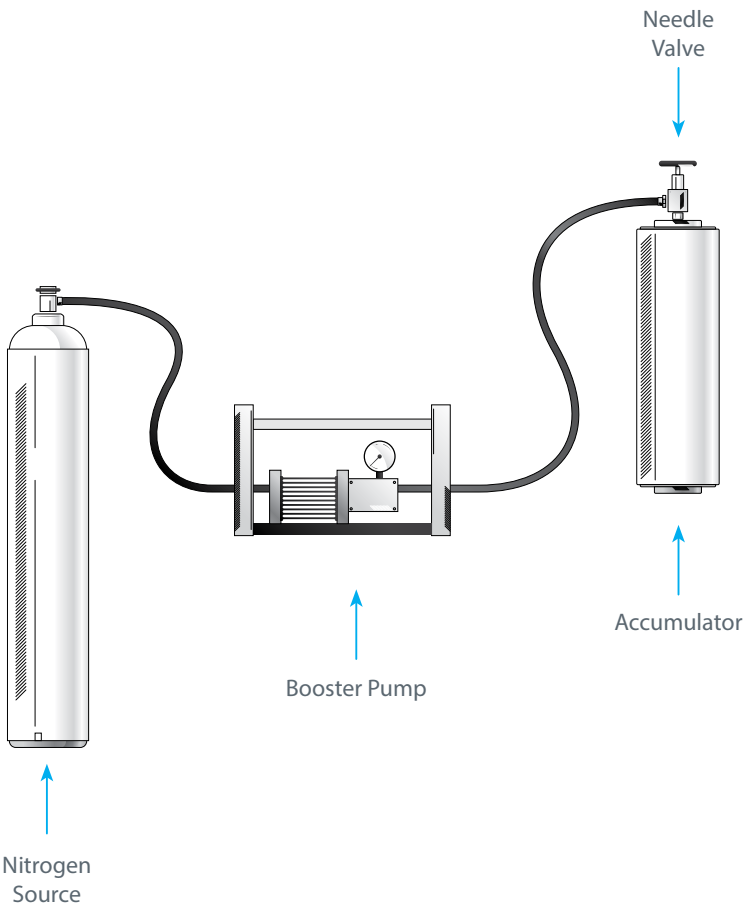
DIS-CHARGING PROCEDURE

- Ensure centre 'T' bar (5) is fully unwound and bleed valve (6) is fully closed. Attach charging set (7) to cylinder gas valve.
- Open bleed valve (6) then slowly wind down the 'T' bar (5) until pressure is heard coming out of the charging set. Leave until all pressure is exhausted.

PRESSURE CHECKING ONLY

- It is advisable that after an Accumulator has been in service for a short period the Pre-charge should be checked to ensure there is no leakage and will adjust for any settling and temperature changes.
- Ensure centre 'T' bar (5) is fully unwound and bleed valve (6) is fully closed. Attach charging set (7) to cylinder gas valve (2).
- Wind down the 'T' bar handle (5) until pressure can be seen on the gauge. Note the pressure.
- Unwind the 'T' bar (5) fully then open bleed valve (6) to release any trapped pressure. Remove charging set.
- If the pre-charge is lower than expected then follow the charging instructions again. If repeated charging is required there may be a leak in the system and further investigation will need to be done.

8/ PRE-CHARGING AND DIS-CHARGING PROCEDURE FOR HIGH PRESSURE ACCUMULATORS AND SIMILAR UNITS OVER 760 BARG



CHARGING PROCEDURE

- Unwind the needle valve (anti-clockwise) to open position and operate the booster pump to introduce Nitrogen into the accumulator. Ensure that the pressure is monitored frequently so that the pre-charge pressure is not exceeded.
- When desired pressure is reached stop the pump and then close the needle valve (clockwise). Allow for the gas pressure to settle and adjust if necessary.
- Check for leaks around the end cap and needle valve and if OK remove the connection to needle valve.

DIS-CHARGING PROCEDURE

- To dis-charge the unit make sure the connection point on the needle valve is pointing away from you and then open the valve (anti-clockwise). Before maintenance wait for all the gas to escape.

  Refer to section 6 (Venting of Nitrogen)

9/ SERVICING

Servicing should only be carried out by competent persons who are aware of the risks associated with this type of equipment.

Hystat can offer advice on the servicing of all our products and specific instructions for servicing are available on request.

Note: Generally burst discs (rupture discs) are not a serviceable item and should be replaced with new if they rupture. High pressure types can be dismantled and a new disc fitted. Please seek advice from Hystat if this type is fitted.

10/ SPARES

Spares are available for all Hystat Accumulators in particular seal kits.

The seal kit reference number is shown on the drawing otherwise quote the serial number (typically 6 digits A.12345)

11/ SAFETY REQUIREMENTS DURING OPERATION

In order to ensure safety, gas containing pressure vessels such as hydraulic accumulators are designed in accordance with a selected design code which is approved by an appropriate certifying authority.

The Pressure Equipment Regulations (PER) contain the Pressure Systems Safety Regulations, the section relating to piston accumulators is known as PSSR 2000.

It is a requirement of this regulation that associated with each accumulator there is a Written Scheme of Examination (WSE) together with an established maintenance procedure including inspection of the accumulators.

Each user is responsible for creating a WSE and ensuring that the frequency of inspection is appropriate for the continued safe operation of the accumulators.

Accumulators and Gas Bottles do not have an infinite life and are designed for a limited number of cycles. Due to the limited information given for actual operation we have to make assumptions on what the Accumulator will expect to endure throughout its life.

The life of an Accumulator is normally seen to be 20 Years but can be extended if the actual number of pressure cycles and inspection records can be presented to us for review.

The 20 years is based on a number of stress cycles including zero to full pressure for servicing and then a 20% and 5% stress cycle during operation.

(Note; some units may have a much shorter life if used in an unconventional way)

Refer to the design examination certificate relevant to this unit for information regarding life cycles.

If more information is required please contact Hystat:

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NOTES